CLAIMS

WE CLAIM:

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1. A polymer blend for fabricating monolayer films or a layer within a multilayer film, the blend comprising:

a first component selected from the group of: (1) ethylene and α-olefin copolymers having a density of less than about 0.915 g/cc, (2) ethylene copolymerized with lower alkyl acrylates, (3) ethylene copolymerized with lower alkyl substituted alkyl acrylates and (4) ionomers, the first component being present in an amount from about 99% to about 55% by weight of the blend;

a second component in an amount by weight of the blend from about 45% to about 1% and consists of one or more polymers of the group: (1) propylene containing polymers, (2) polybutene polymers, (3) polymethylpentene polymers, (4) cyclic olefin containing polymers and (5) bridged polycyclic hydrocarbon containing polymers; and,

the blend when fabricated into a film having a modulus of elasticity when measured in accordance with ASTM D882 of less than about 60,000 psi, an internal haze when measured in accordance with ASTM D1003 of less than about 25%, an internal adhesion ranking of greater than about 2, a sample creep at 120°C under 27 psi loading of less than or equal to150% for a film having a thickness of from about 5 mils to about 15 mils, and the film being capable or being heat sealed into a container having seals wherein the seals remain intact when the container is autoclaved at 121°C for one hour.

2. The blend of claim 1 wherein the propylene containing polymer is selected from the group consisting of homopolymers of polypropylene, and random and block copolymers and random and block terpolymers of propylene with one or more comonomers selected from α-olefins having from about 2 to about 17 carbons.

3. The blend of claim 2 wherein the second component is a propylene and ethylene copolymer having an ethylene content of from 1-6% by weight of the copolymer.

4. The blend of claim 2 wherein the second component is a blend of a first propylene containing polymer and a second propylene containing polymer.

5. The blend of claim 4 wherein the first propylene containing polymer has a first melt flow rate and the second propylene containing polymer has a second melt flow rate wherein the first melt flow rate is about 3 times greater than the second melt flow rate.

6. The blend of claim 4 wherein the first propylene containing polymer has a first melt flow rate and the second propylene containing polymer has a second melt flow rate wherein the first melt flow rate is about 5 times greater than the second melt flow rate.

7. The blend of claim 4 wherein the first propylene containing polymer has a first melting point temperature and the second propylene containing polymer has a second melting point temperature wherein the first melting point temperature is higher than the second melting point temperature by at least about 5°C..

8. The blend of claim 4 wherein the first propylene containing polymer has a first melting point temperature and the second propylene containing polymer has a second melting point temperature wherein the first melting point temperature is higher than the second melting point temperature by at least about 10°C.

9. The blend of claim 1 wherein the cyclic olefin has from 5 to about 10 carbons in the ring.

10. The blend of claim 9 wherein the cyclic olefin is selected from the group consisting of substituted and unsubstituted cyclopentene, cyclopentadiene, cyclohexene, cyclohexadiene, cycloheptene, cycloheptadiene, cyclooctene, and cyclooctadiene.

11. The blend of claim 1 wherein the bridged polycyclic hydrocarbon has at least 7 carbons.

12. The blend of claim 11 wherein the bridged polycyclic hydrocarbon is selected from the group consisting of polycyclic hydrocarbons having at least 7 carbons.

13. The blend of claim 1 wherein the α-olefin has from 3 to 17 carbons.

14. The blend of claim 1 wherein the α-olefin has from 4 to 8 carbons.

15. The blend of claim 14 wherein the ethylene and α-olefin copolymer is obtained using a single site catalyst.

Sub B1 16. The blend of claim 1 wherein the blend is subjected to electron beam radiation in a dosage amount from about 20 kGy to about 200 kGy.

17. The blend of claim 1 wherein the internal haze when measured in accordance with ASTM D1003 is less than 15%.

Sub B1 18. A polymer blend for fabricating monolayer films or a layer within a multilayer film comprising:

a first component selected from the group of: (1) ethylene and α-olefin copolymers having a density of less than about 0.915 g/cc, (2) ethylene copolymerized with lower alkyl acrylates, (3) ethylene copolymerized with lower alkyl substituted alkyl acrylates and (4) ionomers, the first component being present in an amount from about 99% to about 55% by weight of the blend;

a second component in an amount by weight of the blend from about 45% to about 1% and consists of one or more polymers of the group: (1) propylene containing polymers, (2) polybutene polymers, (3) polymethylpentene polymers, (4) cyclic olefin containing polymers and (5) bridged polycyclic hydrocarbon containing polymers; and,

wherein the blend is subjected to electron beam radiation in a dosage amount from about 20 kGy to about 200 kGy.

Sub A2 19. The blend of claim 18 wherein the blend when fabricated into a film having a modulus of elasticity when measured in accordance with ASTM D882 of less than

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about 60,000 psi, an internal haze when measured in accordance with ASTM D1003 of less than about 25%, an internal adhesion ranking of greater than about 2, a sample creep at 120°C under 27 psi loading of less than or equal to150% for a film having a thickness of from about 5 mils to about 15 mils, and the film being capable or being heat sealed into a container having seals wherein the seals remain intact when the container is autoclaved at 121°C for one hour.

Sub B3 20. The blend of claim 18 wherein the blend is exposed to a oxygen partial pressure less than ambient conditions when exposed to the electron beam radiation.

21. The blend of claim 18 wherein the propylene containing polymer is selected from the group consisting of homopolymers of polypropylene, and random and block copolymers and random and block terpolymers of propylene with one or more comonomers selected from α-olefins having from about 2 to about 17 carbons.

22. The blend of claim 18 wherein the second component is a propylene and ethylene copolymer having an ethylene content of from 1-6% by weight of the copolymer.

23. The blend of claim 18 wherein the second component is a blend of a first propylene containing polymer and a second propylene containing polymer.

24. The blend of claim 23 wherein the first propylene containing polymer has a first melt flow rate and the second propylene containing polymer has a second melt flow rate wherein the first melt flow rate is about 3 times greater than the second melt flow rate.

25. The blend of claim 23 wherein the first propylene containing polymer has a first melt flow rate and the second propylene containing polymer has a second melt flow rate wherein the first melt flow rate is about 5 times greater than the second melt flow rate.

26. The blend of claim 23 wherein the first propylene containing polymer has a first melting point temperature and the second propylene containing polymer has a

second melting point temperature wherein the first melting point temperature is higher than the second melting point temperature by at least about 5°C.

27. The blend of claim 23 wherein the first propylene containing polymer has a first melting point temperature and the second propylene containing polymer has a second melting point temperature wherein the first melting point temperature is higher than the second melting point temperature by at least about 10°C.

28. The blend of claim 18 wherein the cyclic olefin has from 5 to about 10 carbons in the ring.

29. The blend of claim 28 wherein the cyclic olefin is selected from the group consisting of substituted and unsubstituted cyclopentene, cyclopentadiene, cyclohexene, cyclohexadiene, cycloheptene, cycloheptadiene, cyclooctene, and cyclooctadiene.

30. The blend of claim 18 wherein the bridged polycyclic hydrocarbon has at least 7 carbons.

31. The blend of claim 30 wherein the bridged polycyclic hydrocarbon is selected from the group consisting of polycyclic hydrocarbons having at least 7 carbons.

32. The blend of claim 18 wherein the α-olefin has from 3 to 17 carbons.

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33. The blend of claim 18 wherein the α-olefin has from 4 to 8 carbons.

34. The blend of claim 32 wherein the ethylene and α-olefin copolymer is obtained using a single site catalyst.

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35. A monolayer film comprising:

a first component selected from the group of: (1) ethylene and α-olefin copolymers having a density of less than about 0.915 g/cc, (2) ethylene copolymerized with lower alkyl acrylates, (3) ethylene copolymerized with lower alkyl substituted alkyl acrylates and (4) ionomers, the first component being present in an amount from about 99% to about 55% by weight of the blend;

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a second component in an amount by weight of the blend from about 45% to about 1% and consists of one or more polymers of the group: (1) propylene containing polymers, (2) polybutene polymers, (3) polymethylpentene polymers, (4) cyclic olefin containing polymers and (5) bridged polycyclic hydrocarbon containing polymers; and,

the film has a modulus of elasticity when measured in accordance with ASTM D882 of less than about 60,000 psi, an internal haze when measured in accordance with ASTM D1003 of less than about 25%, an internal adhesion ranking of greater than about 2, a sample creep at 120 °C under 27 psi loading of less than or equal to150% for a film having a thickness of from about 5 mils to about 15 mils, and the film being capable or being heat sealed into a container having seals wherein the seals remain intact when the container is autoclaved at 121 °C for one hour.

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36. The film of claim 35 wherein the propylene containing polymer is selected from the group consisting of homopolymers of polypropylene, and random and block copolymers and random and block terpolymers of propylene with one or more comonomers selected from α-olefins having from about 2 to about 17 carbons.

37. The film of claim 36 wherein the second component is a propylene and ethylene copolymer having an ethylene content of from 1-6% by weight of the copolymer.

38. The film of claim 36 wherein the second component is a blend of a first propylene containing polymer and a second propylene containing polymer.

39. The film of claim 38 wherein the first propylene containing polymer has a first melt flow rate and the second propylene containing polymer has a second melt flow rate wherein the first melt flow rate is about 3 times greater than the second melt flow rate.

40. The film of claim 38 wherein the first propylene containing polymer has a first melt flow rate and the second propylene containing polymer has a second melt flow rate wherein the first melt flow rate is about 5 times greater than the second melt flow rate.

41. The film of claim 38 wherein the first propylene containing polymer has a first melting point temperature and the second propylene containing polymer has a second melting point temperature wherein the first melting point temperature is higher than the second melting point temperature by at least about 5°C.

42. The film of claim 38 wherein the first propylene containing polymer has a first melting point temperature and the second propylene containing polymer has a second melting point temperature wherein the first melting point temperature is higher than the second melting point temperature by at least about 10°C.

43. The film of claim 35 wherein the cyclic olefin has from 5 to about 10 carbons in the ring.

44. The film of claim 43 wherein the cyclic olefin is selected from the group consisting of substituted and unsubstituted cyclopentene, cyclopentadiene, cyclohexene, cyclohexadiene, cycloheptene, cycloheptadiene, cyclooctene, and cyclooctadiene.

45. The film of claim 35 wherein the bridged polycyclic hydrocarbon has at least 7 carbons.

46. The film of claim 45 wherein the bridged polycyclic hydrocarbon is selected from the group consisting of polycyclic hydrocarbons having at least 7 carbons.

47. The film of claim 35 wherein the α-olefin has from 3 to 17 carbons.

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48. The film of claim 35 wherein the α-olefin has from 4 to 8 carbons.

49. The film of claim 48 wherein the ethylene and α-olefin copolymer is obtained using a single site catalyst.

50. The film of claim 35 wherein the blend is subjected to electron beam radiation in a dosage amount from about 20 kGy to about 200 kGy.

51. The film of claim 35 wherein the internal haze when measured in accordance with ASTM D1003 is less than 15%.

52. A monolayer film comprising:

a first component selected from the group of: (1) ethylene and α-olefin copolymers having a density of less than about 0.915 g/cc, (2) ethylene copolymerized with lower alkyl acrylates, (3) ethylene copolymerized with lower alkyl substituted alkyl acrylates and (4) ionomers, the first component being present in an amount from about 99% to about 55% by weight of the film;

a second component in an amount by weight of the film from about 45% to about 1% and consists of one or more polymers of the group: (1) propylene containing polymers, (2) polybutene polymers, (3) polymethylpentene polymers, (4) cyclic olefin containing polymers and (5) bridged polycyclic hydrocarbon containing polymers; and,

wherein the film is subjected to electron beam radiation in a dosage amount from about 20 kGy to about 200 kGy.

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53. The film of claim 52 has a modulus of elasticity when measured in accordance with ASTM D882 of less than about 60,000 psi, an internal haze when measured in accordance with ASTM D1003 of less than about 25%, an internal adhesion ranking of greater than about 2, a sample creep at 120°C under 27 psi loading of less than or equal to 150% for a film having a thickness of from about 5 mils to about 15 mils, and the film being capable or being heat sealed into a container having seals wherein the seals remain intact when the container is autoclaved at 121°C for one hour.

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54. The film of claim 52 wherein the film is exposed to a oxygen partial pressure less than ambient conditions when exposed to the electron beam radiation.

55. The film of claim 52 wherein the propylene containing polymer is selected from the group consisting of homopolymers of polypropylene, and random and block copolymers and random and block terpolymers of propylene with one or more comonomers selected from α-olefins having from about 2 to about 17 carbons.

56. The film of claim 52 wherein the second component is a propylene and ethylene copolymer having an ethylene content of from 1-6% by weight of the film copolymer.

57. The film of claim 52 wherein the second component is a blend of a first propylene containing polymer and a second propylene containing polymer.

58. The film of claim 57 wherein the first propylene containing polymer has a first melt flow rate and the second propylene containing polymer has a second melt flow rate wherein the first melt flow rate is about 3 times greater than the second melt flow rate.

59. The film of claim 57 wherein the first propylene containing polymer has a first melt flow rate and the second propylene containing polymer has a second melt flow rate wherein the first melt flow rate is about 5 times greater than the second melt flow rate.

60. The film of claim 57 wherein the first propylene containing polymer has a first melting point temperature and the second propylene containing polymer has a second melting point temperature wherein the first melting point temperature is higher than the second melting point temperature by at least about 5°C.

61. The film of claim 57 wherein the first propylene containing polymer has a first melting point temperature and the second propylene containing polymer has a second melting point temperature wherein the first melting point temperature is higher than the second melting point temperature by at least about 10°C.

62. The film of claim 52 wherein the cyclic olefin has from 5 to about 10 carbons in the ring.

63. The film of claim 52 wherein the cyclic olefin is selected from the group consisting of substituted and unsubstituted cyclopentene, cyclopentadiene, cyclohexene, cyclohexadiene, cycloheptene, cycloheptadiene, cyclooctene, and cyclooctadiene.

64. The film of claim 52 wherein the bridged polycyclic hydrocarbon has at least 7 carbons.

65. The film of claim 64 wherein the bridged polycyclic hydrocarbon is selected from the group consisting of polycyclic hydrocarbons having at least 7 carbons.

66. The film of claim 52 wherein the α-olefin has from 3 to 17 carbons.

67. The film of claim 52 wherein the α-olefin has from 4 to 8 carbons.

68. The film of claim 66 wherein the ethylene and α-olefin copolymer is obtained using a single site catalyst.

69. A method for preparing a non-oriented and non-PVC containing film comprising the steps of:

providing a first component selected from the group of: (1) ethylene and α-olefin copolymers having a density of less than about 0.915 g/cc, (2) ethylene copolymerized with lower alkyl acrylates, (3) ethylene copolymerized with lower alkyl substituted alkyl acrylates and (4) ionomers, the first component being present in an amount from about 99% to about 55% by weight of the blend;

providing a second component in an amount by weight of the blend from about 45% to about 1% and consists of one or more polymers of the group: (1) propylene containing polymers, (2) polybutene polymers, (3) polymethylpentene polymers, (4) cyclic olefin containing polymers and (5) bridged polycyclic hydrocarbon containing polymers;

mixing the first component and the second component to define a blend; and

processing the blend into a monolayer film having a modulus of elasticity when measured in accordance with ASTM D882 of less than about 60,000 psi, an internal haze when measured in accordance with ASTM D1003 of less than about 25%, an internal adhesion ranking of greater than about 2, a sample creep at 120°C under 27 psi loading of less than or equal to150% for a film having a thickness of from about 5 mils to about 15 mils, and the film being capable or being heat sealed into a container having seals wherein the seals remain intact when the container is autoclaved at 121° C for one hour.

70. The method of claim 69 wherein the propylene containing polymer is selected from the group consisting of homopolymers of polypropylene, and random and block copolymers and random and block terpolymers of propylene with one or more comonomers selected from α-olefins having from about 2 to about 17 carbons.

71. The method of claim 69 wherein the second component is a propylene and ethylene copolymer having an ethylene content of from 1-6% by weight of the copolymer.

72. The method of claim 69 wherein the second component is a blend of a first propylene containing polymer and a second propylene containing polymer.

73. The method of claim 69 wherein the first propylene containing polymer has a first melt flow rate and the second propylene containing polymer has a second melt flow rate wherein the first melt flow rate is about 3 times greater than the second melt flow rate.

74. The method of claim 72 wherein the first propylene containing polymer has a first melt flow rate and the second propylene containing polymer has a second melt flow rate wherein the first melt flow rate is about 5 times greater than the second melt flow rate.

75. The method of claim 72 wherein the first propylene containing polymer has a first melting point temperature and the second propylene containing polymer has a second melting point temperature wherein the first melting point temperature is higher than the second melting point temperature by at least about 5°C.

76. The method of claim 72 wherein the first propylene containing polymer has a first melting point temperature and the second propylene containing polymer has a second melting point temperature wherein the first melting point temperature is higher than the second melting point temperature by at least about 10°C.

77. The method of claim 69 wherein the cyclic olefin has from 5 to about 10 carbons in the ring.

78. The method of claim 77 wherein the cyclic olefin is selected from the group consisting of substituted and unsubstituted cyclopentene, cyclopentadiene, cyclohexene, cyclohexadiene, cycloheptene, cycloheptadiene, cyclooctene, and cyclooctadiene.

79. The method of claim 69 wherein the bridged polycyclic hydrocarbon has at least 7 carbons.

80. The method of claim 79 wherein the bridged polycyclic hydrocarbon is selected from the group consisting of polycyclic hydrocarbons having at least 7 carbons.

81. The method of claim 69 wherein the α-olefin has from 3 to 17 carbons.

82. The method of claim 69 wherein the α-olefin has from 4 to 8 carbons.

83. The method of claim 82 wherein the ethylene and α-olefin copolymer is obtained using a single site catalyst.

84. The method of claim 69 wherein the step of processing the blend includes the step of exposing the blend to electron beam radiation in a dosage amount from about 20 kGy to about 200 kGy.

85. The method of claim 69 wherein the step of processing the blend into a monolayer film comprises the step of extruding the blend.

86. A method for fabricating monolayer films or a layer within a multilayer film comprising:

providing a first component selected from the group of: (1) ethylene and α-olefin copolymers having a density of less than about 0.915 g/cc, (2) ethylene copolymerized with lower alkyl acrylates, (3) ethylene copolymerized with lower alkyl substituted alkyl acrylates and (4) ionomers, the first component being present in an amount from about 99% to about 55% by weight of the blend;

providing a second component in an amount by weight of the blend from about 45% to about 1% and consists of one or more polymers of the group: (1) propylene containing polymers, (2) polybutene polymers, (3) polymethylpentene polymers, (4)

cyclic olefin containing polymers and (5) bridged polycyclic hydrocarbon containing polymers;

mixing the first component with the second component to define a blend;

processing the blend into a monolayer film or a layer within a multiple layered film to define a structure; and,

exposing the structure to electron beam radiation in a dosage amount from about 20 kGy to about 200 kGy.

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87. The method of claim 86 wherein the film has a modulus of elasticity when measured in accordance with ASTM D882 of less than about 60,000 psi, an internal haze when measured in accordance with ASTM D1003 of less than about 25%, an internal adhesion ranking of greater than about 2, a sample creep at 120°C under 27 psi loading of less than or equal to 150% for a film having a thickness of from about 5 mils to about 15 mils, and the film being capable or being heat sealed into a container having seals wherein the seals remain intact when the container is autoclaved at 121°C for one hour.

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88. The method of claim 86 wherein the step of exposing the film includes the step of reducing an oxygen partial pressure to less than ambient conditions.

89. The method of claim 86 wherein the propylene containing polymer is selected from the group consisting of homopolymers of polypropylene, and random and block copolymers and random and block terpolymers of propylene with one or more comonomers selected from α-olefins having from about 2 to about 17 carbons.

90. The method of claim 86 wherein the second component is a propylene and ethylene copolymer having an ethylene content of from 1-6% by weight of the copolymer.

91. The method of claim 86 wherein the second component is a blend of a first propylene containing polymer and a second propylene containing polymer.

92. The method of claim 91 wherein the first propylene containing polymer has a first melt flow rate and the second propylene containing polymer has a second melt

flow rate wherein the first melt flow rate is about 3 times greater than the second melt flow rate.

93. The method of claim 91 wherein the first propylene containing polymer has a first melt flow rate and the second propylene containing polymer has a second melt flow rate wherein the first melt flow rate is about 5 times greater than the second melt flow rate.

94. The method of claim 91 wherein the first propylene containing polymer has a first melting point temperature and the second propylene containing polymer has a second melting point temperature wherein the first melting point temperature is higher than the second melting point temperature by at least about 5°C.

95. The method of claim 91 wherein the first propylene containing polymer has a first melting point temperature and the second propylene containing polymer has a second melting point temperature wherein the first melting point temperature is higher than the second melting point temperature by at least about 10°C.

96. The method of claim 86 wherein the cyclic olefin has from 5 to about 10 carbons in the ring.

97. The method of claim 96 wherein the cyclic olefin is selected from the group consisting of substituted and unsubstituted cyclopentene, cyclopentadiene, cyclohexene, cyclohexadiene, cycloheptene, cycloheptadiene, cyclooctene, and cyclooctadiene.

98. The method of claim 86 wherein the bridged polycyclic hydrocarbon has at least 7 carbons.

99. The method of claim 98 wherein the bridged polycyclic hydrocarbon is selected from the group consisting of polycyclic hydrocarbons having at least 7 carbons.

100. The method of claim 86 wherein the α-olefin has from 3 to 17 carbons.

101. The method of claim 86 wherein the α-olefin has from 4 to 8 carbons.

102. The method of claim 100 wherein the ethylene and α-olefin copolymer is obtained using a single site catalyst.

103. The method of claim 86 wherein the step of processing the blend includes the step of extruding the blend into a film or a layer within a multiple layered film.